

## Worksheet 10-17

- Assign all names to a number, beginning with 01 for the first name.
- Simple Random Sample:
  - Pick a line on the back of sheet (random numbers)
  - Break each line into sets of 2 digits
  - Choose first 5 between 01 and 50  
(throw out 51-99 because we don't have names for those digits)
  - Throw out repeating numbers because we need unique names
- Systematic Sample:
  - Randomness comes from where you start
  - If we not told the  $n$ th person, we get to choose.
  - Use random numbers to get starting point.

- Random Sample Stratified by gender:
  - Breaking population into genders, so we will have a total of 10 people.
  - Use the same process as in simple random sample for each gender
- Random Sample Stratified by department:
  - 3 departments, so 15 people total
  - Use same process as Simple random sample for each department

- Random Numbers:

- These are actually very hard to generate such that all numbers have an equal chance of being selected.
- There are ways around this, so we are able to generate truly random numbers.

- Random Selection:

- Use random numbers to give us an unbiased sample of a population.
- Assign items/people/things a number and use random number list to select sample.
- Need need as many digits in your assignment as you have items.

1 digit  $\rightarrow$  10 items  $10^1 \leftarrow$

2 digits  $\rightarrow$  100 items  $10^2 \leftarrow$

3 digits  $\rightarrow$  1000 items  $10^3 \leftarrow$

## • Simulation

- Way to imitate real life by using random numbers
- Trial  $\rightarrow$  answer to a simulation
- Component  $\rightarrow$  one part of a trial;  
many components create a full trial
- Response Variable  $\rightarrow$  the trial's outcome

- Steps to building a simulation:
  - Specify how to model a component outcome using equally likely random digits
  - 1. Identify the component to be repeated.
  - 2. Explain how you will model the component's outcome.
  - Specify how to simulate trials
  - 3. Explain how you will combine components to form a trial.
  - 4. State clearly what the response variable is.
  - Put it all together and run the simulation.
  - 5. Run several trials.
  - Analyze the response variable.
  - 6. Collect and summarize the results of all your trials.
  - 7. State your conclusion.